Problem 2: Azure Migration Solution for Our Setup

# Azure Services Mapping

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| **Our System** | **Azure Equivalent** | **Details** |
| S1 (Linux App + MySQL) | Azure VM (Linux) + Azure Database for MySQL | Host Linux app on VM; managed MySQL database (PaaS) |
| S2 (PHP/MySQL Web App) | Azure App Service (PHP) + Azure Database for MySQL | Fully managed App Service |
| S3 (PHP/PostgreSQL Web App) | Azure App Service (PHP) + Azure Database for PostgreSQL | Fully managed PHP app |
| S4 (Python/Django/SQLite3 App) | Azure App Service (Python) + Azure Files (Storage) | Use Azure Files for SQLite data or small PostgreSQL replacement |
| S5 (Java Web App) | Azure App Service (Java) + Azure Database for PostgreSQL | Managed Java app with scalable database |
| Backup Server | Azure Backup + Azure Blob Storage | Backups for VMs, App Services, Databases |

# System Architecture on Azure

* **S1** → Azure VM running Linux application.
* **S2** → Azure App Service (PHP) + Azure Database for MySQL.
* **S3** → Azure App Service (PHP) + Azure Database for PostgreSQL.
* **S4** → Azure App Service (Python) + Azure Files (storage).
* **S5** → Azure App Service (Java) + Azure Database for PostgreSQL.
* **Backup** → Azure Backup (VM snapshots + App/DB backups).
* **Public Access** → All apps routed through Azure Front Door (global load balancer, HTTPS).

# Azure Network Components

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| **Component** | **Purpose** |
| Azure VNET | Private networking for VMs, App Services, Databases |
| Azure Subnets | Logical segmentation (App, Database, Management) |
| Azure NSG (Network Security Groups) | Internal firewall rules |
| Azure Front Door | Global access, SSL offloading, Load Balancing |
| Azure Private Link | Secure private connectivity to Database and Storage services |

# Backup and Security Plan

* Enable **Azure Backup** for VM (S1) – Weekly full backup + daily incremental.
* Enable **Automatic Backups** for Azure Database for MySQL/PostgreSQL (Daily).
* **Azure Monitoring** (Azure Monitor + Log Analytics) for health checks, alerts.
* **Azure Security Center** (Free or Standard tier) for baseline security posture.
* **Azure Key Vault** to store secrets, certificates, credentials.
* **Azure DDoS Protection Basic** (Free) to protect from large-scale attacks.

# Azure Sizing and Pricing Estimation (Ballpark)

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| **Service** | **Type/Size** | **Estimated Cost (Monthly USD)** |
| Azure VM (S1) | Standard B2s (2vCPU, 4GB RAM) | ~$50 |
| Azure App Service (S2, S3, S4, S5) | Standard Plan (per App) | ~$60 × 4 = $240 |
| Azure Database for MySQL (S1/S2) | Basic SKU | ~$30 |
| Azure Database for PostgreSQL (S3/S5) | Basic SKU | ~$30 |
| Azure Blob Storage (Backup) | 500 GB Storage | ~$10 |
| Azure Front Door | Small Workload | ~$35 |
| Azure VNET + Networking | Flat cost | ~$10 |

## Total Estimated Monthly Cost: ~$405–$450 USD

## Annual Cost (Recurring): ~$4,860–$5,400 USD/year

# Final Summary

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| **Aspect** | **On-Premises** | **Azure Cloud** |
| Capex (Hardware Purchase) | ~$17,100 upfront | $0 |
| Opex (Running Cost) | ~$11,750/year | ~$5,000/year |
| Scalability | Medium (hardware limit) | Very High (scale instantly) |
| Redundancy | Manual (Extra Hardware) | Azure High Availability built-in |
| Backup | Manual (Bacula/Restic) | Automated Azure Backup |
| 24x7 Uptime SLA | Manual | 99.9%+ Azure SLA |
| Security | pfSense Firewall | Azure Security Center, NSG, Private Link |
| Maintenance | Manual (IT Admin required) | Azure Managed Services |

# Final Verdict:

* Eliminates upfront hardware investment.
* Improves scalability, security, automation, and backup reliability.
* **Saves ~$6,500/year** compared to on-premises after hardware depreciation.
* Offers seamless management via **Azure Portal** and **DevOps automation** if needed.
* Excellent for future scaling, high availability, and global app reach.